



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/728,038	12/01/2000	Hung Chen	AMAT/3778/CMP/CMP/RKK	2584
44257 7590 01/03/2011 PATTERSON & SHERIDAN, LLP - - APPM/TX 3040 POST OAK BOULEVARD, SUITE 1500 HOUSTON, TX 77056				
EXAMINER				
GRANT, ALVIN J				
ART UNIT		PAPER NUMBER		
3723				
MAIL DATE		DELIVERY MODE		
01/03/2011		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

09/728,038

Applicant(s)

CHEN ET AL.

Examiner

ALVIN J. GRANT

Art Unit

3723

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 September 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2, 4-13, 15, 16, 19-33 and 37-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4-13, 15, 16, 19-33 and 37-45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 1, 2, 4-9, 11, 15, 16, 28-33, 38, 39 and 42** are rejected under 35 U.S.C. 102(b) as being anticipated by Burke 5,645,469.

Regarding claims 1, 2 and 4, Burke discloses an pad, comprising a semiconductor polishing device having a first surface defining at least two non-intersecting fluid retaining grooves **(40)** at least a portion of which is oriented at an angle relative to a radial line originating at a center of the semiconductor polishing device, wherein the non-intersecting fluid retaining grooves extend from **an edge** to the center portion of the semiconductor polishing device to an edge of the semiconductor polishing device and are adapted to flow a fluid inwardly toward a center portion of the semiconductor polishing device, and wherein at least one of the non-intersecting fluid retaining grooves is sloped so that a groove depth changes along a length of the at least one non-intersecting fluid retaining groove **(Fig. 4)**.

Regarding claims 5-7, 9, 11, 15, 16, 28-33, 38 and 39, see Fig. 4, and column 5, line 44 -column 6, line 14.

Regarding claims 8 and 42, see drawing below.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

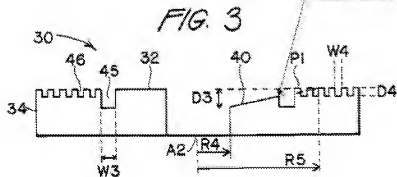
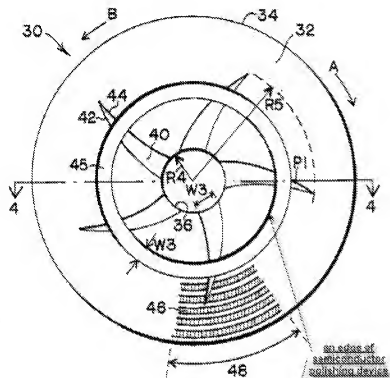
4. **Claims 10, 12, 13, 19-24, 25-27, 37, 40, 41 and 43-45** are rejected under 35

U.S.C. 103(a) as being unpatentable over Burke.

Burke, as described above, discloses the claimed features in the embodiment involving

Fig. 4. In other embodiments; however, Burke discloses the use of a platen and a pad having perforations (**e.g., 7:30-35**) are known; and implicitly discloses the use of a

motor as well.



Response to Arguments

5. Applicant's arguments filed 9/2/10 have been fully considered but they are not persuasive.

- Applicant's argument that US Patent 5,645,469 (to Burke) fails to teach the non-intersecting fluid retaining grooves extending from a center portion of the

semiconductor polishing device to **an edge** of the semiconductor device in not convincing. The figure above discloses this feature.

- Applicant's argument that Burke does not teach a pad having a center is not convincing. The figures above clearly show a center.
- In response to Applicant's argument that extending the channel to **the edge** of Burke's pad would cause the slurry to flow past the wafer and off the pad, Applicant claims recite **an edge** of the pad and this feature is satisfied by Burke.
- In response to Applicant's argument that Burke does not teach *no point on the grooves is tangent to a radial line extending from a center of the substrate polishing pad* as recited in claim 15, Fig. 3 above show that no point on the grooves in question (i.e. 40) would have a tangent extending from the center. The other elements of claim 15 have been addressed above.
- In response to Applicant's argument that Burke does not teach, show, suggest, or otherwise make obvious *a substrate polishing pad, comprising: a substrate polishing pad, comprising (a) a polishing surface on a first side of the substrate polishing pad; and (b) a mounting surface on a second side of the substrate polishing pad, wherein at least one of the polishing surface and the mounting surface has a plurality of non-intersecting fluid retaining grooves formed therein, wherein the grooves extend from a center portion of the semiconductor polishing device to an outer portion of the semiconductor polishing device and are disposed so that upon a given direction of movement of the substrate polishing pad a fluid disposed in the grooves is urged to flow from the outer portion toward*

the center portion of the substrate polishing pad, and wherein the grooves are formed on the mounting surface and the substrate polishing pad comprises perforations extending between the polishing surface and the mounting surface, and wherein at least one of the non-intersecting fluid retaining grooves is sloped so that a groove depth changes along a length of the at least one non-intersecting fluid retaining groove, as recited in amended claim 16, please see above. Additionally, the pad is mounted on a platen (202) which constitutes a mounting surface and regarding the perforations, Burke discloses that this feature is known.

- In response to Applicant's arguments that Burke does not teach, show, suggest, or otherwise make obvious an apparatus for polishing a substrate, comprising (a) one or more rotatable platens; (b) a motor coupled to the rotatable platens; (c) one or more polishing heads rotatably mounted in facing relation to the rotatable platens; and (d) a polishing pad disposed on each of the rotatable platens, wherein at least one of the rotatable platens and the polishing pads comprise a plurality of non-intersecting fluid retaining grooves formed on a first surface thereof and wherein at least a portion of the grooves are disposed at an angle to a radial line extending from a center of the first surface and are adapted to flow a fluid inwardly from an outer portion to a center portion of the first surface, and wherein at least one of the non-intersecting fluid retaining grooves extends from a center portion of the semiconductor polishing device to an outer portion of the semiconductor polishing device and is sloped so that a groove depth changes*

along a length of the at least one non-intersecting fluid retaining groove, as recited in claim 19 and claims dependent thereon, Burke discloses a rotatable platen which is inherently rotatable. Regarding a rotatable polishing head, this feature is also inherent.

- In response to Applicant's argument that Burke does not teach, show, suggest, or otherwise make obvious *a rotatable platen for a polishing system, comprising a patterned pad mounting surface forming a plurality of non-intersecting fluid retaining grooves each having a portion oriented at an angle relative to a radial line originating at a center of the pad, the portion adapted to flow a fluid inwardly from a perimeter portion to a center portion of the platen during rotation of the platen, and wherein at least one of the non-intersecting fluid retaining grooves wherein at least one of the non-intersecting fluid retaining grooves extends from the center portion of the semiconductor polishing device to an outer portion of the semiconductor polishing device and is sloped so that a groove depth changes along a length of the at least one non-intersecting fluid retaining groove, as recited in amended claim 28 and claims dependent thereon*, please see above.
- In response to Applicant's argument that *Burke does not teach, show, suggest, or otherwise make obvious an apparatus, comprising an apparatus, comprising a semiconductor polishing device having a first surface defining at least one non-intersecting fluid retaining groove at least a portion of which is oriented at an angle relative to a radial line originating at a center of the semiconductor polishing device, and wherein the non-intersecting fluid retaining groove has a*

first portion and a second portion having a same direction of curvature and defining a tangent point to the radial line and wherein the non-intersecting fluid retaining groove extends from a center portion of the semiconductor polishing device to an outer portion of the semiconductor polishing device and is adapted to flow a fluid inwardly toward a center portion of the semiconductor polishing device, and wherein the non-intersecting fluid retaining groove is sloped so that a groove depth changes along a length of the non-intersecting fluid retaining groove, as recited in amended claim 32 and claims dependent thereon, please see above.

- *In response to Applicant's argument that Burke does not teach, show, suggest, or otherwise make obvious an apparatus for polishing a substrate, comprising (a) a rotatable platen; (b) a motor coupled to the rotatable platen; (c) a polishing head rotatably mounted in facing relation to the rotatable platen; and (d) a polishing pad disposed on the rotatable platen, wherein a plurality of non-intersecting slurry retaining grooves are formed at an interface between the polishing pad and the rotatable platen and wherein a first portion of the grooves are oriented to flow slurry inwardly from an outer region to an interior region at the interface between the polishing pad and the respective rotatable platens for a given direction of rotation of the platen, and wherein a second portion of the grooves are oriented to flow slurry outwardly from a central region to the interior region at the interface between the polishing pad and the rotatable platen for the given direction of rotation of the platen, and wherein at least one of the non-*

intersecting fluid retaining grooves extends from a center portion of the semiconductor polishing pad to an outer portion of the semiconductor polishing pad and is sloped so that a groove depth changes along a length of the at least one non-intersecting fluid retaining groove, as recited in claim 37, please see above.

- In response to Applicant's argument that *Burke does not teach, show, suggest, or otherwise make obvious an apparatus, comprising a semiconductor polishing device having a first surface defining at least two fluid retaining grooves at least a portion of which is oriented at an angle relative to a radial line originating at a center of the semiconductor polishing device, wherein the fluid retaining grooves extend from a center portion of the semiconductor polishing device to an edge of the semiconductor polishing device and are adapted to flow a fluid inwardly toward a center portion of the semiconductor polishing device, and wherein at least one of the fluid retaining grooves is sloped so that a groove depth changes along a length of the at least one fluid retaining groove as recited in amended claim 38 and claims dependent thereon, please see above.*
- Applicant's argument regarding newly added claims 43-45 are moot in view of the foregoing.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALVIN J. GRANT whose telephone number is (571)272-4484. The examiner can normally be reached on Mon-Fri 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph J. Hail can be reached on (571) 272-4485. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. J. G./
Examiner, Art Unit 3723

/Joseph J. Hail, III/
Supervisory Patent Examiner, Art Unit 3723